```
REFERENCE
AUTHORS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       FEATURES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               VERSION
KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          AE006482
LOCUS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            REFERENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   SOURCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ACCESSION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          DEFINITION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   TITLE
JOURNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     TITLE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ORGANISM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        AUTHORS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         MEDLINE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 JOURNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     PUBMED
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        gene
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             CDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 gene
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 CDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               source
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               .
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1 (bases 1 to 11289)

**Recrett!, J.J., McShan, W.M., Adjic, D., Savic, D., Savic, G., Lyon, K., Primeaux, C., Sezate, S.S., Surorov, A.N., Kenton, S., Lai, H., Lin, S., Qian, Y., Jia, H.G., Najar, F.Z., Ren, Q., Zhu, H., Song, L., White, J., Yuan, X., Clifton, S.W., Roe, B.A. and McLaughlin, R.E.

**Complete genome.** sequence of an Ml strain of Streptococcus pyogenes** Process Nati **Acadiago Complete genome.** Sequence of an Ml strain of Streptococcus pyogenes** Process Nati **Acadiago Complete genome.** Sequence of an Ml strain of Streptococcus pyogenes** Process Nati **Acadiago Complete genome.** Sequence of an Ml strain of Streptococcus pyogenes** Process Nati **Acadiago Complete genome.** Sequence of an Ml strain of Streptococcus pyogenes** Process Nati **Acadiago Complete genome.** Sequence of an Ml strain of Streptococcus pyogenes** Process Nati **Acadiago Complete genome.** Sequence of an Ml strain of Streptococcus pyogenes** Process Nati **Acadiago Complete genome.** Sequence of an Ml strain of Streptococcus pyogenes** Process Nati **Acadiago Complete genome.** Sequence of an Ml strain of Streptococcus pyogenes** Process Nati **Acadiago Complete genome.** Process National Recommendation of Streptococcus pyogenes** Process National Reco
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Submitted (10-APR-2001) Department of Microbiology and Immunology, University of Oklahoma Health Sciences Center, 940 SL Young Blvd, Oklahoma City, OK 73104, USA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Ferretti,J.J., McShan,W.M., Adjic,D., Savic,D., Savic,G., Lyon,K., Primeaux,C., Sezate,S.S., Surorov,A.N., Kentcon,S., Lai,H., Lin,S., Qian,Y., Jia,H.G., Najar,F.Z., Ren,Q., Zhu,H., Song,L., White,J., Yuan,X., Clifton,S.W., Roe,B.A. and McLaughlin,R.E.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Streptococcus pyogenes M1
Streptococcus pyogenes M1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Streptococcus pyogenithe complete genome. AE006482 AE004092
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Direct Submission
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Streptococcus.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Bacteria; Firmicutes; Lactobacillales; Streptococcaceae
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          AE006482.1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              AE006482
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             (bases 1 to 11289)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    HOVHGEYPTWYEDYEVSPKMKIDGNSLDFVQNPQDLATVLKMIDTKLKELHLL" COMplement(2157. .3134)
/gene="SPy0122"
                                                                           DINMGCPVNKVVKNEAGAKWLRDPDKIYHIVKEVTSVLDIPLTVKMRTGWADSSLAVE
NALAAESAGVSALAMHGRTREQMYTGTCDHETLARVSKAITKIPFIGNGDVRSVQDAK
                                                                                                                                                   /translation="miklnssfrigdveiphrtvlapmagvtnsafrtiakefgaglv
vmemisekgllynnektlhmlhidenehpmsiqlfgdaeglkraadfiqtntkadiv
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         complement(2157. .3134)
/gene="SPy0122"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        /translation="MLIVLAGTIGAGKSSLAAALGEHLGTDVFYEAVDNNPVLDLYYQ
DPKKYAFLLQIYFLNKRFKSIKEAYQADNNILDRSIFEDELFLKLNYKNGNVTKTELD
IYQELLANNLEELEGMPKKRPDLLIYIDVSFDKMLERIERRGRSFEQVDGNPSLEQYY
LKGETIAVREFRGLAPHYLRGTAGAAKVRGAVSRAETLAEVEAIFETVR*
                                           fmieeigvdavmigraamnnpylftqinhffetgqelpdlpfakkldiakdhlkrlin
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      /note="Best Blastp hit = dbj|BAB16044
similar to Lactobacillus acidophilus
[Streptococcus zooepidemicus]"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Location/Qualifiers
                                                                                                                                                                                                                                  /product="possible transcriptional regulator"
/protein_id="AAK33234.1"
/db_xref="GI:13621424"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           /product="putative
kinase(I) subunit"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 /gene="SPy01
/EC_number="
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             /gene="SPy0121"
                                                                                                                                                                                                                                                                                                                                                  transl_table=11
                                                                                                                                                                                                                                                                                                                                                                                                     ||Streptococcus pyogenes||" | gb|AAC97155.1| (U49397) unknown
|Codon =+==+-1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         /db_xref="taxon:160490"
complement(1496. .2137)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        /serotype="Ml"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                /strain-"SF370"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                /organism="Streptococcus pyogenes
/mol_type="genomic DNA"
                                                                                                                                                                                                                                                                                                                                                                                             /codon_start=1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   /db_xref="GI:13621423"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           /protein_id="AAK33233.1"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      /transl_table=11
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              /codon_
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      GI:13621422
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 number-"2.7.1.113"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              11289 bp DNA linear BCT 01-JUN-2001 pyogenes M1 GAS strain SF370, section 11 of 167 of
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          _start=1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       GAS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           deoxyguanosine kinase/deoxyadenosine
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              dbj|BAB16044.1| (AB030884)
acidophilus dA/dG-kinase
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ĭ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        GAS"
   CDS
                                                                       gene
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Sdo
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   gene
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 CDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         gene
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 CDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         CDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             gene
```

20

11:56:15

ر د د د د

hit = gb|AAC97152.1| (U49397) unknown

```
/gene="SPy0129"
9784. 10497
/gene="SPy0129"
                                                                                                                                                                                                                           /translation="mklrhllltgaaltsfaattvhgetyvngakltytknldlvnsn
Alinvftyrklybekldkyptystytstyryqvhlumeegokpyatyivstkgs
Strekpgyyykytekldkyptystytstyryvythytytstystystysty
KVPIOFKNSLDSTTLTVKKKVSGTGGDRSKDFNFGLTLKANQYYKASEKVMIEKTKG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      /gene="SPy0128"
8752. .9774
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          /gene="SPY0127"
8324. .8719
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 /Traislation="MIEXYLESSIESKCQLIVLFFKTSYLPITEVAEKTGLTFLQLNH
/CTEELNAFFPGSLSWTIQKRWISCQFTHPFKETYLYQLYASSNVLQLLAFLIKNGSHS
RPLTDFARSHFLSNSSAYRMEALIPLLRHFELKLSKNKIVGESYTIKTLIALLYSKF
GIKVYDLTQODKNTHESCHSSTHLKTSPWLSESFSFVDILLALSWKRHGESVTIPQ
TRIFQQLKKLFVYDSLKKSSHDIIETYCQLNFSAGDLDYLYLIYITANNSFASLQWTP
EHIRQYCQLFEENDTFRLLLNPIITLLPNLKEQKASLVKALMFFSKSFLFNLQHFIPE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    complement(3121. .3993)
/gene="SPy0123"
/note="Best Blastp hit = db]|BAB03806.1| (AP001507)
unknown conserved protein [Bacillus halodurans]"
                                                                                                                                                                                                                                                                                                                                        /product="hypothetical protein"
/protein_id="AAK33238.1"
/db_xref="GI:13621428"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  TNLFVSPYYKGNQKLYTSLKLIVEEWMAKLPGKRDLNHKHFHLFCHYVEQSLRNIQPP
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      complement(4140.
/gene="rofA"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           FNESDLEATISDKA"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              EVLVGPFMGNGHFVTIIDYGTGNPYTSTTPLITGEIGEDFAYYLTESEQTPSAIGLNV
LLDENDKVKVAGGFMVQVLPGASEEEIARYEKRLQEMPAISHLLASKNHVDALLEAIY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   /translation="MDKIIKSIAOSGAFRAYVLDSTETVALAQEKHNTLSSSTVALGR
TLIANQILAANQKGDSKITVKVIGDSSFGHIISVADTKGHVKGYIQNTGVDIKKTATG
                                                                                                                                              VKKKNA
                                                                                                                                                                     SAVKNIAGNSTEQETSTDKDMTITFTNKKDFEVPTGVAMTVAPYIALGIVAVGGALYF
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    /translation="MIIKRNDMAPSYKAGDAILFYRLSQTYKVEEAVVYEDSKTSITK
VGRIIAQAGDEVDLTEQGELKINGHIQNEGLTFIKSREANYPYRIADNSYLILNDYYS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              complement(4140.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      GDEPYKRLSEEPLSFQCDCSRERFEAALMTLPKADLQAMIDEDKGAEIVCQFCGTKYQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           /product="putative heat shock protein HSP33"
/protein_id="AAK33235.1"
/db_xref="GI:13621425"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            DESENYLODATAKDATKGTINTLIRLRNH"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       /product="putative signal peptidase
/protein_id="AAK33237.1"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               /codon_start=1
/transl_table=11
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 /gene="SPy0127"
/note="Best Blastp hit =
[Streptococcus pyogenes]"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        LVVVFVASNFINAHLLTDSFPRYFSDKSIDFHSYYLLQDNVYQIPDLKPDLVITHSQL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          /product="regulatory protein"
/protein_id="AAK33236.1"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   /gene="rofA"
note="Best Blastp
                                                                                                                                                                                                                                                                                                                                                                                                                           transl_table=11
                                                                                                                                                                                                                                                                                                                                                                                                                                                         codon_start=1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             note-"Best Blastp hit = gb|AAC97152.1| (U49397) unknown
Streptococcus pyogenes]"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            'gene="SPy0128"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  'db_xref="GI:13621427"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          PFVHHELTKGIAVAEISFDESILSIQELMYQVKEEKFQADLTKQLT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   /db_xref="GI:13621426"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      /transl_table=11
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             codon_start=1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      note-"synonym:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              /transl_table=11
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  'codon_start=1
                                                                                                             .10497
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              SPY0124"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              .5633)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  gb|AAC97149.1| (U49397) LepA
```

```
Alignment
Pred. No.:
                                                                                                                                                                                                                                                                                                                                                                BASE COUNT
ORIGIN
                                                                                                                                                                                                                                                                                                Best Local Similarity:
Query Match:
DB:
                                                                                                                              Q
                                                                                                                                              В
                                                                                                                                                              Qy
                                                                                                                                                                             β
δ
                                                                                                                                                                                                                 Дb
                                                                                                                                                                                                                            δã
                                                                                                                                                                                                                                             DP
GA
                      B 65 B 65
                                                                                45 A
                                                                                                                                                                                                                                                                                 US-09-494-297-2
                                                                                                                                                                                                                                                                                                                        Percent Similarity:
      õ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               gene
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                CDS
                                                                                                                                                                                                                                                                                                                                         No . :
                                                                                                                                                                                                                   5956
                                                                                                                                                                                                                                                  5896
                                                                                                                                                                                    6016
                                                                                       6196
                                                                                                                                                     6076
                                                       6256
                                                                                                                                                                                                                                                                                                                                                 Scores:
                                                                      121
                                                                                                     101
        161
                                                                                                                                    81
                                                                                                                                                                    61
                                                                                                                                                                                                   41
                                                                                                                                                                                                                                  21
                                                                                                                                                                                                                                                                  ب
                                                                                                                                                                                                                                                 ValThrSerMetValGlyAlaLysThrValPheGlyLeuValGluSerSerThrProAsn
                                                                                                                                                                                                                  AlaIleAsnProAspSerSerSerGluTyrArgTrpTyrGlyTyrGluSerTyrValArg
                                                                                                                                                                                     GTAACTTCCATGGTTGGTGCTAAGACTGTTTTTGGTTTAGTAGAATCCTCGACGCCAAAC
                                                      GCAATAAATCCAGATTCAAGTTCGGAATACAGATGGTATGGATATGAATCTTATGTAAGA
AsnGlyHisProGlnAsnAlaAsnGlyIleMetGluGlyLeuGluProLeuAsnAlaIle
                        GCGATGAGCCCTAGAATTACGGGAGATGAGCTAAATCAGAAGTTACGAGCTGTTATGTAT
                                AlaMetSerProArgIleThrGlyAspGluLeuAsnGlnLysLeuArgAlaValMetTyr
                                                                                                                                                                                                                                                                                                                                                                         3820
                                                                                                                                                                                                                                                                                  (1-757)
                                                                                                                                                                                                                                                                                                                                                                         a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       /translation="MIVRLIKLLDKLINVIVLCFFFLCLLIAALGIYDALTVYQGANA-TNYQQYKKKGYQFDDLLAINSDYMAWLTVKGTHLDYFIYQGENNLBYFINKSVEGETSL GGSVFLDYRNKVTFEDKYSLIYAHHMAGNVMFGELPNFRKKSFFNKHKESFIETKTKQ KLKINIFACIOTDAFDSLLFNPIDVDISKNEFLNHIKOKSVQYKEILTTNESRFVAL STCEDMTTDGRIJVIGQIE"
                                                                                                                                                                                                                                                                                                                                                                                /product="hypothetical protein"
/protein_id="AAK33240.1"
/protein_id="AAK33240.1"
/db_xref="01:13621430"
/td_sref="01:13621430"
/translation="MKKSILRIAGYLLMSFCLLDSVEAENLTASINIEVINQVDVA
TNKQSSDIDETFMFVLEKSLDKESPLPMSVTTSVKGNGKTSFEQLTFSEVGQYHYKIHQ
LLGKNSQYHYDETVYEVVIYVLYNEQSGALETNLVSNKLGETEKSELIFKQEYSEKTP
EPHOPDTTEKEKPQKKRNGILPSTGEMVSYVSALGIVLVATITLYSIYKKLKTSK"
                                                                                                                                                                                                                                                                                                                                                                                                                                              /gene="SPy0130"
/note="Best Blastp hit = gb|AAC97151.1|
[Streptococcus pyogenes]"
/codon_start=1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                /product="hypothetical
/protein_id="AAK33239.:
/db_xref="GI:13621429"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       [Streptococcus pyogenes]"
/codon_start=1
/transl_table=11
                                                                                                                                                                                                                                                                                                                                                                                                                                                                               /gene="SPy0130"
10519. .11166
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 10519
                                                                                                                                                                                                                                                                                                                                                                                                                                         transl_table=11/
                                                                                                                                                                                                                                                                                                          2.84e-243
3945.00
100.00%
100.00%
100.00%
                                                                                                                                                                                                                                                                                  x AE006482
                                                                                                                                                                                                                                                                                                                                                                          O
                                                                                                                                                                                                                                                                                  (1-11289)
                                                                                                                                                                                                                                                                                                                                                                         Ð
                                                                                                                                                                                                                                                                                                Length:
Matches:
Conservative:
Mismatches:
Indels:
Gaps:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       9.1"
                                                                                                                                                                                                                                                                                                  11289
757
0
0
0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  (049397)
                                                                                                                        6195
                                                                                                                                                       6135
                                                                                                                                                                                      6075
                                                                                                                                                                                                                     6015
                                                                                                                                                                                                                                                   5955
                          6375
                                                         6315
                                                                                        6255
                                                                                                                                        100
                                                                                                                                                                      80
                                                                                                                                                                                                     60
                                                                                                                                                                                                                                     40
                                                                                                                                                                                                                                                                   20
           180
                                         160
                                                                        140
                                                                                                        120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δÃ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          밁
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        δÃ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ф
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          뫄
                                                                                                                                                                                                                                                                                                                                                                                                                                         ρy
                                                                                                                                                                                                                                                                                                                                                                                                                                                         밁
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       δÃ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          В
                                                                                                                                                                                                                                        Qy
                                                                                                                                                                                                                                                            밁
                                                                                                                                                                                                                                                                          Qy
                                                                                                                                                                                                                                                                                             В
                                                                                                                                                                                                                                                                                                          Qy
                                                                                                                                                                                                                                                                                                                           В
                                                                                                                                                                                                                                                                                                                                       Qy
                                                                                                                                                                                                                                                                                                                                                           멍
                                                                                                                                                                                                                                                                                                                                                                       Qγ
                                                                                                                                                                                                                                                                                                                                                                                           В
                                                                                                                                                                                                                                                                                                                                                                                                         γQ
                                                                                                                                                                                                                                                                                                                                                                                                                           В
                                                                                                                                          δÃ
                                                                                                                                                              밁
                                                                                                                                                                           Ωy
                                                                                                                                                                                          Ъ
                                                                                                                                                                                                         γQ
                                                                                                                                                                                                                            В
   g Qy
                                             δõ
                                                                멍
                                                                             δã
                                                                                            Дb
                                                                                                             γQ
                                                                                                                               B
                             Дb
                                                                                                                                                                                                                                                                                                                                                                                                                           6676
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           6496
                                                                                                                                                                                                                                                                                                                             6856
                                                                                                                                                                                                                                                                                                                                                            6796
                                                                                                                                                                                                                                                                                                                                                                                            6736
                                                                                                                                                                                                                                                                                                                                                                                                                                                            6616
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           6556
                                                                                                                                                                                                                                                                                             6916
                                                                                                                                                                7156
                                                                                                                                                                                                                              7036
                                                                                                                                                                                                                                                             6976
                                                                                                  7276
                                                                                                                                7216
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           201
                                                                                                                                                                                                                                                                                                                                                                                                                                           261
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          241
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           221
                                                                                                                                                                                               7096
                                                                                                                                                                                                                                                                                                                                                                            301
                                                                                                                                                                                                                                                                                                                                                                                                            281
                                                                                                                                                                               421
                                                                                                                                                                                                              401
                                                                                                                                                                                                                                             381
                                                                                                                                                                                                                                                                             361
                                                                                                                                                                                                                                                                                                           341
                                                                                                                                                                                                                                                                                                                                           321
                                                                                  481
                                                                                                                 461
                                                                                                                                                441
                                                 501
```

6376 GluSerPheLysArgGluSerGluSerAsnLeuValSerThrSerGlnLeuSerLeuMet ArgValThrGlnGluAlaValTrpTyrTyrSerAspAsnAlaProIleSerAsnProAsp AATGGACATCCACAAAATGCCAATGGTATTATGGAAGGCTTGGAACCCTTGAATGCTATC 6435 CGTCAAGCTTTGAAGCAACTGATTGATCCGAATTTGGCCAACTAAAATGCCAAAACAAGTT ArgGlnAlaLeuLysGlnLeuIleAspProAsnLeuAlaThrLysMetProLysGlnVal GAAAGTTTTAAAAGGGAGTCAGAAAGTAACTTGGTTAGTACTTCTCAATTATCTTTGATG AGAGTTACACAAGAGGCGGTATGGTACTATTCTGATAATGCTCCTATTTCTAATCCAGAT 200 240 6495 6555 220 6675 6615 ÷ 280 260

6735 300

ProProMetProProAsnGlnProGlnThrThrSerValLeuIleArgLysTyrAlaIle 6795

7035 400 380

6975

CCCAATAAAGAGATAGTAGAGCCTTACTCAGTAGAAGCATATAATGATTTTGAAGAATTT ProAsnLysGluIleValGluProTyrSerValGluAlaTyrAsnAspPheGluGluPhe

7155

.7095

460 7215 440

7335 7275

7395 500

```
REFERENCE
AUTHORS
                                                                                                                                                                                                                                                                                                                   ACCESSION
VERSION
KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                          RESULT 2
AB083107
LOCUS
                                                                                                                                                                         JOURNAL
REFERENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Š
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        밁
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δÃ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                밁
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Ş
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        В
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Ş
                                                                                                                                                                                                                                                                                                                                                                                                                                                  밁
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ₽
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Ωy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   В
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        δõ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Š
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δ
                                                                                                                                                                                                                                                                                                       SOURCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        멍
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ф
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δδ
Β
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Ş
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Ş
                                                                                                                                                                                                                                                                                                                                                                             DEFINITION
                                                                                                                                                 AUTHORS
TITLE
                                                                                                                                                                                                                                                                                           ORGANISM
                                                                                                                                                                                                                    TITLE
                                               source
Aug 20
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           8056
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  7996
                                                                                                                                                                                                                                                                                                                                                                                                                                                    8116
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               7876
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     7816
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    7696
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  7576
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              701
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             741
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 641
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      621
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      581
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             561
                                                                                                                                                                                                                                                                                                                                                  complete
AB083107
                                                                                                                                 Direct Submission Submitted (03-APR-2002) Tohru Miyoshi-Akiyama,
                                                                                                                                                                                      Unpublished
                                                                                                                                                                                                                  Miyoshi-Aktya<u>ng-GrassMaki</u>saka<sub>sMass</sub>Zhao,JasandsUchiyama,T
Characterizaition of collagen binding protein (Cpa) of J
                                                                                                                                                                                                                                                                                         Streptococcus
                                                                                                                                                                                                                                                                                                       Streptococcus
                                                                                                                                                                                                                                                                                                                                                                          AB083107
Streptococcus
                                                                        Medical University, Department of Microbiology and Immunology; Rawada.cho, Shinjuku-ku, Tokyo 162-8666, Japan (E-mail:KFa01112enifty.ne.jp, Tel:81-3-3353-8111(ex.22713), Fax:81-3-5269-7411)
                                                                                                                                                          Miyoshi-Akiyama, T., Wakisaka, N.,
                                                                                                                                                                                                                                                                           Bacteria; Firmicutes; Lactobacillales;
                                                                                                                                                                                                                                                                                                                                    AB083107.1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       IleSerLeuGlyIleTrpGlyIleHisThrIleArgIleArgLysHisAsp 757
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        CATGGGGAAAGTTTAACACTTCAAGGTTTACCAGAAGGTTATTCTTACCTTGTCAAAGAA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              H1sG1yGluSerLeuThrLeuGlnGlyLeuProGluGlyTyrSerTyrLeuValLysGlu
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      GTTAAAACAGATAAAACAAACCTCGAATTTAAAGATGGTAAAGCAACCATTAATTTAAAA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ValLysThrAspLysThrAsnLeuGluPheLysAspGlyLysAlaThrIleAsnLeuLys
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          CCTGTAACTCATAATTTAACATTGAGAAAAACGGTGACTGGTTTAGCTGGTGACAGAACT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ProValThrHisAsnLeuThrLeuArgLysThrValThrGlyLeuAlaGlyAspArgThr
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       GlnTrpHisProGluAspLeuValAspIleIleArgMetGluAspLysLysGluValIle
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          CAGTGGCATCCAGAAGATTTAGTTGATATTATTCGTATGGAAGATAAAAAAAGAAGTTATA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       LeuThrAspLeuAspPhePheIleProAsnAsnAsnLysTyrGlnSerLeuIleGlyThr
                                                                                                                                                                          (bases 1 to 2400)
                                                                                                                                                                                                     A streptococcus
                                                                                                                                                                                                                                                                                                                                                              cds.
                                                        Location/Qualifiers
                                /organism="Streptococcus
                                                                                                                                                                                                                                                                                                                                   GI:23503477
                                                                                                                                                                                                                                                                                         pyogenes
                                                                                                                                                                                                                                                                                                                                                                          pyogenes
                                                                                                                                                                                                                                                                                                                                                                             cpa1
                                                                                                                                                                                                                                                                                                                                                                                       2400
                                                                                                                                                                                                                                                                                                                                                                             gene
                                                                                                                                                                                                                                                                                                                                                                                        đđ
                                                                                                                                                                                                                                                                                                                                                                          DNA lipear BCT 21cJAN 2003 for collagen binding protein,
                                                                                                                                                             Zhao,J.
                               pyogenes
                                                                                                                                                                                                                                                                         Streptococcaceae;
                                                                                                                                                             and
                                                                                                                                                             Uchiyama
                                                                                                                                                                                                                  (Cpa) of M1-type
                                                                                                                                 Tokyo Women's
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               620
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          7695
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      600
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            720
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      7875
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            7815
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      640
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   7755
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         7575
                                                                                                                   8-1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           8115
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     740
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  8055
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          7995
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     700
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               7935
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            680
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   660
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  7635
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             580
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     560
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Percent Similarity:
Best Local Similarity:
Query Match:
DB:
                                                                                                                                                                                   δÃ
                                                                                                                                                                                                                                             δõ
                                                                                                                                                                                                                                                                                                  Qy
                                                                                                                                                                                                                                                                                                                                                           ρ
                                                                                                                                                                                                                                                                                                                                                                                                                   ΩV
                                                                                                                                                                                                                                                                                                                                                                                                                                                  밁
                                                                                                                                                                                                                                                                                                                                                                                                                                                                            QΥ
                                                                  δÃ
                                                                                                    뫄
                                                                                                                            Q
                                                                                                                                                             밁
                                                                                                                                                                                                                  밁
                                                                                                                                                                                                                                                                           Вр
                                                                                                                                                                                                                                                                                                                                   밁
                                                                                                                                                                                                                                                                                                                                                                                          В
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         US-09-494-297-2 (1-757) x AB083107
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ORIGIN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    BASE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Score:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Pred
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Alignment
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           .
No.:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           gene
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  COUNT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  CDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Scores:
                                                                        141
                                                                                                    454
                                                                                                                                 121
                                                                                                                                                             394
                                                                                                                                                                                        101
                                                                                                                                                                                                                    334
                                                                                                                                                                                                                                                                            274
                                                                                                                                                                                                                                                                                                                                   214
                                                                                                                                                                                                                                                                                                                                                                                          154
                                                                                                                                                                                                                                                                                                       61
                                                                                                                                                                                                                                                                                                                                                              41
                                                                                                                                                                                                                                              81
                                                                                                                                                                                                                                                                                                                                                                                                                      21
                                                                                                                                                                                                                                                                                                                                                                                                                                                  94
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             \vdash
                                              GGGCATCCATATTATAAACAGTTTAGAGTAGCACACGATTTAAGGGTTAACTTAGAAGGA
                                                                                                                                                                                                                                 GlyHisProTyrTyrLysGlnPheArgValAlaHisAspLeuArgValAsnLeuGluGly
                                                                                                                                                                                                                                                                           GCAATAAATCCAGATTCAAGTTCGGAATACAGATGGTATGGATATGAATCTTATGTAAGA
                                                                                                                                                                                                                                                                                           AlaIleAsnProAspSerSerSerGluTyrArgTrpTyrGlyTyrGluSerTyrValArg
                                                                                                                                                                                                                                                                                                                                    GTAACTTCCATGGTTGGTGCTAAGACTGTTTTTGGTTTAGTAGAATCCTCGACGCCAAAC
                                                                                                                                                                                                                                                                                                                                                  ValThrSerMetValGlyAlaLysThrValPheGlyLeuValGluSerSerThrProAsn
                                                                                                                                                                                                                                                                                                                                                                                          AAAAACTCAAAACGATTTACTGTCACTTTAGTGGGAGTCTTTTAATGATCTTCGCTTTG
                                                                                                                                                                                                                                                                                                                                                                                                      LysasnSerLysargPheThrValThrLeuValGlyValPheLeuMetIlePheAlaLeu
                                                                                                                                                                                                                                                                                                                                                                                                                                                    ATGAAAAAAACAAGGTTTCCAAATAAGCTTAATACTCTAATACTCAAAGGGTATTAAGT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                MetLysLysThrArgPheProAsnLysLeuAsnThrLeuAsnThrGlnArgValLeuSer
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    873
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        /transl_table=11
/product="collagen binding protein"
/protein_id="bac20340.1"
/protein_id="bac20340.1"
/protein_id="bac20347.0"
/db_xref="collagen binding protein"
/db_xref="collagen binding protein"
/db_xref="collagen binding protein"
/translation="maktrepwkLmtlwTorvLskNskreTvTLVgVFLMIFALVTSM
/translation="maktrepwkLmtlwTorvLskNskreTvTLVgVFLMokLrvLlegsr
VgAktvFGLVESSTPNAINDDSSSEYRWYSSDNAPISNeDeSFKRESESNLVSTSQLS
VgAktvFGLVESSTPNAINDDSSSEYRWYXSDNAPISNEDESFKRESESNLVSTSQLS
NGHDQNANGLMGGLEPLNAIRVTQEAVWYXSDNAPISNEDESFKRESESNLVSTSQLS
LMRQALKQLIDPNLATKMPKQVPDDFQLSIESESDKGDKVNKGYQNLLSGGLVPTKPP
TPGDPPMPPNQCQTTSVLIRKYAIGDYSKLLEGATLQLTGDNVNSFQARVPSSNDIGE
RIELSDGTYTLTELNSPAGYSIAEPITFKVEAGAVYTILDGKQIENPRNEIVEPYSVE
AYNDFEEFSVLTTQNYAKFYYAKNKNGSSQVVYCFNADLKSPDDSEDGGKTMTPDFTT
GEVKYTHIAGROLFKYTWKPROTDPDTFLKHIKKVIEKGYREKGQAIEYSGLTETQLR
AATQLAIYYFTDSAELDKDKLKDYHGFGDMNDSTLAVAKILVEXAQDSNPPQLTDLDF
FIPNNNKYGSLISGTWHPEDLVDIINMGDKKEVIPVTHNLTLKKTVTGLAGDRTKDFH
FEIELKNNKQELISGTWTDKTTNLEFKOGKATINLKHGESLTLGCLPGYSYLVKETD
SEGYKYKNSOEVANATYSKTGITSDETLAFENNKEPVVPTGVDQKINGYLALLVIAG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 /gene="cpal"
/codon_start=1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ISLGIWGIHTIRIRKHD"
364 c 463 g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       /serotype="M1"
/db_xref="taxon:1314"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    /mol_type="genomic
/strain="291"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             /country="Japan"
94. .2367
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 9.11e-244
3941.00
100.00%
99.87%
99.90%
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         (1-2400)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Length:
Matches:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Gaps:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Conservative: Mismatches:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Indels:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    700
```

40 153 20

60

213

11:56:15

2002

573

513 140 453 120 393 100 333 80 273

Submitted (12-N	JOURNAL	כבו seraraGiuneuAspLysAspLysLeuLysAspTyrHisGlyPheGlyAspMetAsnAsp 540	Ş
Bessen, D.E. and Direct Submissi	TITLE	Construction of the constr	?
21043101 11854196 2 (bases 1 to	REFERENCE	501 GlyLeuThrGluThrGlnLeuArgAlaAlaThrGlnLeuAlaIleTyrTyrPheThrAsp 520	P 64
zone encoding e Streptococcus p Infect. Immun.	JOURNAL	481 HistleLysLysVallleGluLysGlyTyrArgGluLysGlyGlnAlaIleGluTyrSer 500 	рb
Streptococcus.  1 (bases 1 to Bessen, D.E. and Genomic localia	REFERENCE AUTHORS		Db
Streptococcus parteria: Firmt	KEYWORDS SOURCE ORGANISM		Db Qy
MsmRL (msmRL), unknown gene. AF447492	ACCESSION		pb Qy
AF447492 Streptococcus p	AF447492 LOCUS DEFINITION	401 SerValLeuThrThrGlnAsnTyrAlaLysPheTyrTyrAlaLysAsnLysAsnGlySer 420 	Db
/41 lleserbeugly 	N)	381 ProAsnLysGluIleValGluProTyrSerValGluAlaTyrAsnAspPheGluGluPhe 400 	Qy
2254 GTTCCTACAGGAC		361 ThrPheLysValGluAlaGlyLysValTyrThrIleIleAspGlyLysGlnIleGluAsn 380 	Qy
194		341 GlyThrTyrThrLeuThrGluLeuAsnSerProAlaGlyTyrSerIleAlaGluProIle 360 	ОУ
bal ThraspserGluck		321 SerPheGlnAlaArgValPheSerSerAsnAspIleGlyGluArgTleGluLeuSerAsp 340 	Оy
, 4- 1-		. 301 GlyAspTyrSerLysLeuLeuGluGlyAlaThrLeuGlnLeuThrGlyAspAsnValAsn 320 	Оy
641 ValLySThrAsp		281 ProProMetProProAsnGlnProGlnThrThrSerValLeuIleArgLysTyrAlaIle 300 	Qy Db
b21 LysaspPheHis             954 AAAGATTTCCAT	ш	261 GIYTyrGlnAsnLeuLeuSerGlyGlyLeuValProThrLysProProThrProGlyAsp 280 	Оу
	ы	241 ProAspAspPheGlnLeuSerIlePheGluSerGluAspLysGlyAspLysTyrAsnLys 260 	ОУ
581 GlnTrpHisPro	L	221 ArgGlnAlaLeuLysGlnLeuIleAspProAsnLeuAlaThrLysMetProLysGlnVal 240 	Оy
561 LeuThrAspLeu.              1  1  1  1  1  1  1  1  1		201 GluSerPheLysargGluSerGluSerAsnLeuValSerThrSerGlnLeuSerLeuMet 220 	. Qy
SerinrieuAla 		181 ArgValThrGlnGluAlaValTrpTyrTyrSerAspAsnAlaProIleSerAsnProAsp 200 	Qy
		161 AsnGlyHisProGlnAsnAlaAsnGlyIleMetGluGlyLeuGluProLeuAsnAlaIle 180 	Оy

PUBMED REFERENCE AUTHORS TITLE JOURNAL	JOURNAL	REFERENCE AUTHORS TITLE	URCE ORGAN	ACCESSION VERSION KEYWORDS	RESULT 3 AF447492 LOCUS DEFINITION	Db . 2	Оу	Oy Db 2	Db 2	Qy	Db 2	0 V		Db 2		Qу 1	Db 1	Qy	Db :	Qy	Db :	Qy	Db 1	Oy 1	
11854196 2 (Dases 1 to 16207) Bessen, D.E. and Kalia, A. Direct Submission Submitted (12-NOV-2001) Epidemiology & Public Health, Yale	reptococcus pyogenes fect. Immun. 70 (3), 1159-1167 (2002) 943101	(bases 1 tssen, D.E. a nomic local ne encodino	2 2 2 2	AF447492 AF447492.1 GI:19224132	AF447492  16207 bp DNA linear BCT 07-MAR-2002  Streptcocccus pyogenes RofA (rofA), protein F (prtF1.12), Cpa (cpa 12), LepA (lepA), EftLSL.A (eftLSL.A12), EftLSL.B (eftLSL.B),  MsmRL (msmRL), and protein F2 (prtF2.12) genes, complete cds; and unknown gene.	314 ATCAGTTTGGGGATCTGGGGAATTCACACGATAAGGATAAGAAAACATGAC 23	SerLeuGlyIleTrpGlyIleHisThrIleArgIleArgLysH1s	721 ValProThrGlyValAspGlnLysILeAsnGlyTyrLeuAlaLeuIleValIleAlaGly 740 	194 TCAAAAACAGGAATAACAAGTGA	erLysThrGlyIleThrSerAspGluThrLeuAlaPheGluAsnAsnLysGluI	134 A	0/4 CAIGGGGAAAGITITAACACITCAAGGTTTACCAGAAGGTTATTCTTACCTTGTCAAAGAA 2 681 ThraspSerGluGlvTvrLvsVallvsValaspSerGloGluValalasacaalamhtval 7	661 HisGlyGluSerLeuThrLeuGlnGlyLeuProGluGlyTyrSerTyrLeuValLysGlu 680	2 :	641 VällvaThräspIvsThräspIndidinbelvsäspClvIvsälathriloveticiCkkkvi 201	621 LysAspPheHisPheGluIleGluLeuLysAsnAsnLysGlnGluLeuLeuSerGlnThr 64	.894 CC	roValThrHisAsnLeuThrLeuArgLysThrValThrGlyLeuAlaGlyAspAı		lnTrpHisProGluAspLeuValAspIleIleArgMetGluAspLysLysGluV		euAspPhePheIleProAsnAsnAsnLysTyrGlnSerLeuIle	714 AGTACTTTAGCAGTTGCTAAAATCCTTGTAGAATACGCTCAAGATAGTAATCCTCCACAG 17	.654 AGTGCTGAATTAGATAAGGATAAACTAAAAGACTATCATGGTTTTTGGAGACACGAACATGAATGA	